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INTRODUCTION

On July 7, 2003, the Board adopted amendments to Chapter 101 (Subdivision Ordinance), Chapter 104 (Erosion and Sedimentation Control), Chapter 112 (Zoning Ordinance), and Chapter 118 (Chesapeake Bay Preservation Ordinance) of the Code of the County of Fairfax, Virginia and to the Public Facilities Manual (PFM). The amendments implemented revisions to the State's Chesapeake Bay Preservation Area Designation and Management Regulations (9 VAC 10-20 et seq.) which required that Resource Protection Areas (RPAs) be designated around all water bodies with perennial flow. The amendments to the various County ordinances and PFM became effective on November 18, 2003, following the Board's adoption of amendments to the map of Chesapeake Bay Preservation Areas depicting perennial streams and revised RPA boundaries.

The centerpiece of the revised State regulations is that RPAs must now be designated around all water bodies with perennial flow. Perennial flow means that water always flows in the stream or other water body except during periods of drought. Staff from the Department of Public Works and Environmental Services (DPWES) conducted field studies to identify all perennial streams throughout the County and used this information to prepare the 2003 maps showing the location of RPAs as defined under the amended ordinance. The maps display the general locations of RPA boundaries for planning purposes. The actual RPA limits may be further refined by detailed field studies conducted as part of the site development process to obtain a permit to develop a property.

The map of Chesapeake Bay Preservation Areas, originally adopted by the Board in 1993, was based on perennial streams as depicted on United States Geological Survey (USGS) topographic maps. The USGS maps do not accurately depict the extent of perennial streams throughout the County. The stream mapping project was initiated by the Board at the request of the Environmental Quality Advisory Council (EQAC) prior to the State's adoption of its revised Regulations and was originally intended to be completed over a three year time period. Under the original schedule, the field studies would not have been completed by the State's deadline of March 1, 2003, for incorporating the revised Regulations into local ordinances. However, the revised Regulations did not require the County to update the 1993 map and it was anticipated that property owners would be required to have studies performed, as part of the development process, to identify perennial streams not depicted on the 1993 map. When the State extended the implementation deadline from March 1, 2003, to December 31, 2003, it became possible to complete the field work on an expedited basis, using consultants to perform some of the field work, and to prepare an updated map prior to the new implementation deadline. This relieved property owners of the burden of having studies performed for every development site in proximity to a stream located outside of the RPAs depicted on the 1993 map. Even under the expedited schedule, the field work for the planned Quality Assurance/Quality Control (QA/QC) phase of the project was not able to be completed prior to adoption of the maps. The field work for the QA/QC study was performed during the spring and summer of 2004.

This report summarizes the results of the QA/QC study. In addition, it address request from the Board of Supervisors that were made as part of the map adoption including:

- Review all newly submitted data following adoption of the map amendments to include challenges to the perennial stream designation and recommendations to resolve the challenges, and to make any recommended changes.
- Review the process for keeping the maps up to date and to report back to the Planning Commission and Board of Supervisors on the process.

BACKGROUND

THE CHESAPEAKE BAY WATERSHED

The Chesapeake Bay is nearly 200 miles long and is 35 miles wide at its widest point. The Bay is the largest estuary in the United States and is home to more than 3,600 species of plants, fish, and animals. The Bay provides habitat and food for these species and serves as a commercial and recreational resource for the more than 15 million people who live in its watershed.

A watershed is the area of land drained by a water body, such as a river, stream, lake, or bay. The size of a watershed can vary from a few acres for a small stream to many thousand square miles. A large watershed will have subwatersheds within it and will be part of a larger river basin.

The Chesapeake Bay watershed is comprised of 64,000 square miles of land in parts of six states (Delaware; Maryland; New York; Pennsylvania; Virginia; and West Virginia) and the entire District of Columbia. The Chesapeake Bay and its tributaries (streams and rivers that supply water to the Bay) cover more than 4,500 square miles, and include an estimated 18 trillion gallons of water.

FAIRFAX COUNTY WITHIN THE CHESAPEAKE BAY WATERSHED

Fairfax County, located in Northern Virginia, has an area of approximately 395 square miles and over one million residents. Within the county are 30 subwatersheds which all drain to the Potomac River. These 30 watersheds are part of the larger Potomac River watershed, which, in turn, is part of the even larger Chesapeake Bay watershed.

Everything Fairfax County residents do on the land impacts the quality of local streams, the Occoquan Reservoir, the Potomac River, and eventually the Chesapeake Bay. The source of water for any water body comes from groundwater and surface runoff. Groundwater is water from rain and snow that has soaked into the ground. Conversely, surface runoff is water from rain and melting snow that cannot be absorbed into the ground due to impervious surfaces and therefore travels over land until reaching a water body.

Before reaching a stream, surface water runoff accumulates from the highest points in a watershed and flows downhill across lawns, rooftops, parking lots, roads, and other impervious surfaces, picking up contaminants along the way. This runoff makes it way into our local streams, the Potomac River and eventually the Chesapeake Bay. Contaminants such as oil, gasoline, cigarette butts, pet waste, fertilizers, pesticides and more are transported by the runoff

impacting water quality. Soil erosion from farmland, construction sites and stream banks also travels downstream degrading streams habitat conditions and impacting the health of the biological community. The combination of runoff and the contaminants it carries have resulted in poor water quality in the Chesapeake Bay.

CHESAPEAKE BAY PROTECTION

In December of 1983, the governors of Maryland, Virginia, and Pennsylvania; the mayor of the District of Columbia; the administrator of the EPA; and the chair of the Chesapeake Bay Commission, signed the first Chesapeake Bay Agreement. The stated goals of the 1983 Chesapeake Bay Agreement were to implement coordinated plans to improve and protect water quality and living resources of the Chesapeake Bay estuarine system. This Agreement established a unique tri-state partnership that recognized the regional importance of the Bay and the substantial problems associated with establishing environmental policy for an area that spans a diverse geographic and political area.

In 1988, the Commonwealth of Virginia through CBLAB enacted the Chesapeake Bay Preservation Act (Bay Act) to comply with the 1983 Chesapeake Bay Agreement. The Bay Act required the 84 Virginia communities that border on tidal portions of rivers that drain into the Chesapeake Bay (Tidewater jurisdictions), including Fairfax County, to institute water quality protection measures to improve the declining health of this unique national resource and its tributaries. The goal was to plan for and manage the adverse environmental impacts of growth and development in a manner that balances the objectives of improved water quality and continued growth. One method to plan for and manage such impacts is to manage the land. The Bay Act directed each Tidewater jurisdiction to designate Chesapeake Bay Preservation Areas, which is land that if improperly used or developed could have the potential to cause significant harm to the water quality and adversely impact the Bay. These Chesapeake Bay Preservation areas could be divided into Resource Protection Areas (RPAs) and Resource Management Areas (RMAs).

To comply with the Bay Act, the Fairfax County Board of Supervisors enacted a Chesapeake Bay Preservation Ordinance (Ordinance) in 1993 that regulates the kinds of development that can occur in Chesapeake Bay Preservation Areas in Fairfax County. The 1993 Ordinance states that RPAs shall consist of sensitive lands at or near the shoreline that have intrinsic water quality value due to the ecological and biological processes they perform or are sensitive to impacts that may cause significant degradation to the quality of state waters. In their natural conditions, these lands provide for the removal, reduction, or assimilation of sediments, nutrients, and potentially harmful or toxic substances in surface runoff entering the Bay and its tributaries, and minimize the adverse effects of human activities on state waters and aquatic resources.

The Resource Protection Area shall include:

1. Tidal wetlands;
2. Nontidal wetlands connected by surface flow and contiguous to tidal wetlands or *tributary streams*;
3. Tidal shores;

4. Such other lands under the provisions of subsection A of 9 VAC 10-20-80 necessary to protect the quality of state waters;
5. A buffer area not less than 100 feet in width located adjacent to and landward of the components listed in subdivisions 1 through 4 above, and along both sides of any tributary stream.

Under the 1993 CBPO, a tributary stream is defined as any perennial stream that is so depicted on the most recent U.S. Geological Survey 7.5 minute topographic quadrangle map (scale 1:24,000).

The remainder of the land in Fairfax County has been designated as a Resource Management Area (RMA). RMAs are comprised of lands that, if improperly used or developed, have a potential for causing significant harm to the water quality or for diminishing the functional value of RPAs.

In December of 2001, CBLAB adopted amendments to the Chesapeake Bay Preservation Area Designation and Management Regulations. The centerpiece of the revised state regulations is that RPAs must now be designated around all water bodies with perennial flow. Perennial flow means that water always flows in the stream or other water body except during periods of drought. The difference between the old language and the amended language is the replacement of "tributary streams" with "water bodies with perennial flow." The state mandated that Fairfax County and other Tidewater jurisdictions implement these changes to the regulation by December 31, 2003. The revisions include a requirement to perform site-specific surveys using a scientifically valid method to identify water bodies with perennial flow.

In 2002, the Fairfax County Department of Public Works and Environmental Services created a Perennial Stream Field Identification Protocol and Data Sheet to address the new regulations. The protocol is used for making site specific field determinations between perennial and non-perennial (intermittent or ephemeral) streams and supports fieldwork for the Fairfax County Perennial Streams Identification and Mapping project. Several existing protocols were used to develop this protocol including the following:

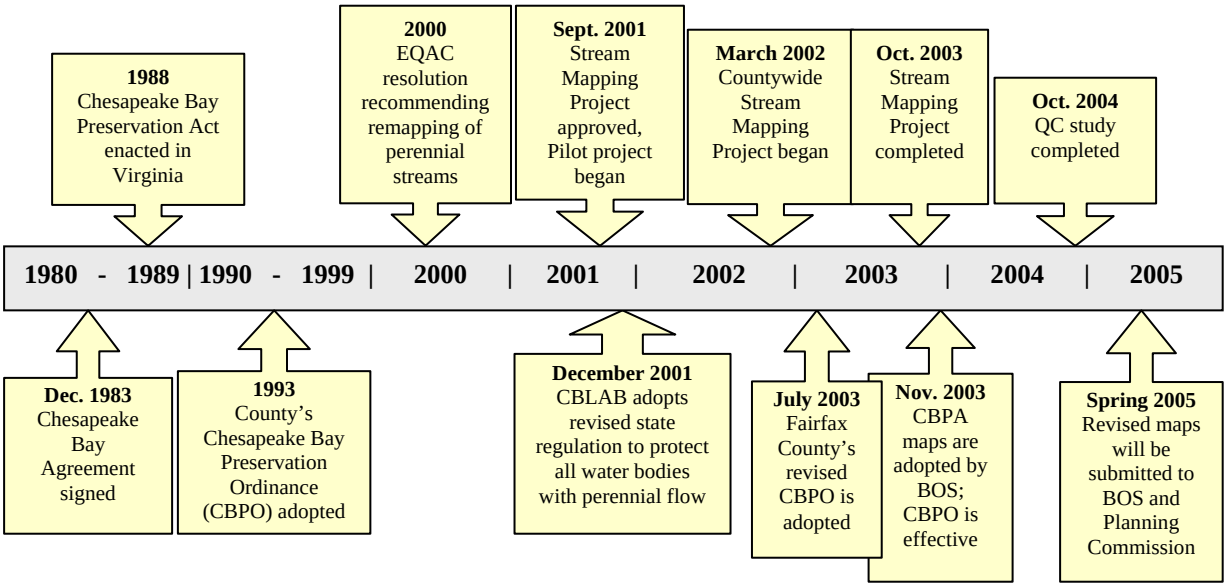
- North Carolina Division of Water Quality's "Perennial Stream Reconnaissance Protocols," January 2000. Version 2.0.
- U.S. Corps of Engineers "Branch Guidance Letter No 95-01: Identification of Intermittent versus Ephemeral Streams—Not Ditches," October 1994.
- Virginia Chesapeake Bay Local Assistant Department's "Very Rough Draft Guidance for Making Perennial vs. Intermittent Stream Determinations," December 2000.
- Williamsburg Environmental Group, Inc. "Qualitative Field Procedures for Perennial Stream Determinations." [unpublished manuscript] Corresponding Author: D.A. DeBerry.

The determination between perennial and intermittent streams is based on the combination of hydrological, physical and biological characteristics of the stream. Field indicators of these characteristics are classed as primary or secondary and ranked using a four-tiered, weighted scoring system. The protocol developed and used by County staff was reviewed by CBLAB and approved as an acceptable method of determining perennial streams. All headwater streams in

the County were surveyed from March 2002 through October 2003 and new RPA maps were published in November 2003, increasing the total length of RPA from 520 miles to 850 miles.

Fairfax County's Board of Supervisors approved the amendments which became effective on November 18, 2003. The recent amendments will are designed to improve the health of the Chesapeake Bay and will further safeguard the quality of Fairfax County's rivers and streams.

This report presents the results of the Quality Control/Quality Assurance (QC) study. The goal of the QC study was to assess both the accuracy and precision of the field surveys based on an evaluation of streams under different hydrologic conditions than the original survey was completed.



DEFINITIONS

The characterization of stream flow within the County is currently defined as follows:

Perennial Stream - A body of water flowing in a natural or man-made channel year-round, except during periods of drought. The term "water body with perennial flow" includes perennial streams, estuaries, and tidal embayments. Lakes and ponds that form the source of a perennial stream, or through which the perennial stream flows, are a part of the perennial stream. Generally, the water table is located above the streambed for most of the year and groundwater is the primary source for stream flow. In the absence of pollution or other manmade disturbances, a perennial stream is capable of supporting aquatic life.

Intermittent Stream - A body of water flowing in a natural or man-made channel that contains water for only part of the year. During the dry season and periods of drought, these streams will

not exhibit flow. Geomorphological characteristics are not well defined and are often inconspicuous. In the absence of external limiting factors (pollution, thermal modifications, etc), biology is scarce and adapted to the wet and dry conditions of the fluctuating water level.

QUALITY CONTROL/QUALITY ASSURANCE (QC) STUDY

METHODOLOGY

The Quality Control/Quality Assurance (QC) study component of the Perennial Streams Identification and Mapping project was completed between May and October 2004.

Approximately 13 percent of the streams initially surveyed between 2002 and 2003 were resurveyed as part of the QC process. While the majority of these sites were randomly selected, many of them were targeted based on the following criteria:

- Visual evaluation of tributaries to determine areas that may be suspect (large or small drainages areas),
- Sites where surveys were completed by our consultant teams,
- Borderline sites where field notes from original surveys indicate a particular stream should be resurveyed in a drier or wetter season, and
- Sites where DPWES original determination has been disputed. These include development sites [rezoning or by-right] or residents' calls disputing determinations.

QC surveys were completed throughout the moist to normal conditions of spring 2004 for watersheds originally surveyed during the 2002 hydrologic drought (approximately 35% of the total streams surveyed during the QC study). The remaining watersheds, originally surveyed in 2003 during a period of normal to above average rainfall, were assessed beginning in late July 2004 under normal to drier weather conditions (approximately 65% of the total streams surveyed during the QC study). All QC fieldwork was completed by October 2004 (Table 1).

Table 1: Watersheds surveyed during the 2004 QC study

Spring 2004

Initially surveyed during hydrologic drought. Resurveyed under moist to normal conditions.

Approximately 35% of the total streams surveyed during the QC study

Horsepen Creek	Popes Head Creek	Little Hunting Creek	Cub Run	Difficult Run

July – October 2004

Initially surveyed under normal to moist conditions. Resurveyed under normal to drier conditions.

Approximately 65% of the total streams surveyed during the QC study

Cameron Run	Pimmit Run	Occoquan	Kane Creek	Nichols Run
Pohick Creek	Bull Neck Run	Bull Run	Pond Branch	Accotink Creek
Dead Run	Wolf Run	Belle Haven	Sugarland Run	Little Rocky Run
Scotts Run	Sandy Run	Ryans Dam	Old Mill Branch	Johnny Moore Creek
Turkey Run	High Point	Dogue Creek	Mill Branch	Four Mile Run

The process of making a final determination for each stream was consistent with the method used during the original Perennial Streams Identification and Mapping project. At each site, reach boundaries were identified and documented on the field map. These boundaries were

based on hydrological, physical, and/or biological features. Using the Fairfax County Perennial Stream Field Identification Protocol, a data sheet was completed for each reach until a confident determination was made.

The general guidelines developed by the City of Greensboro, North Carolina for their Stream Identification and Mapping for Water-Supply Watershed Protection study* were also followed. These guidelines used to evaluate the original surveys include:

- The upstream reach break point should be within 200 feet of the previously mapped reach break point
- The total score should be within ± 7 points of the original field survey, and
- The final stream classification should be the same (perennial or non-perennial) as the original survey.

If these criteria were not met, the data collected from the original and QC surveys were reviewed by the field team members to determine the final classification. The Chesapeake Bay Preservation Area maps were adjusted accordingly, upstream or downstream, to reflect any changes.

RESULTS

During the first two years of the Perennial Streams Identification and Mapping project, 330 additional miles of streams were protected within Resource Protection Areas (RPA). During the year-long QC process 5.5 additional miles were added bringing the total of streams protected by RPA to 855.5 miles, excluding shorelines (Table 2). There was a gross change of 1.2% (7.7 miles) in RPA during the QC process but only a net change of 0.6% (5.5 miles).

Table 2: Length of Fairfax County's Resource Protection Areas, after net increase from QC study

	Length (miles)
Shorelines	118
Streams	520
New 2003	330
2003 Total (with shoreline)	968
2003 Total (without shorelines)	850
New 2004	7.7
Removed 2004	2.2
Net 2004	5.5
2004 Total (with shorelines)	973.5
2004 Total (without shorelines)	855.5

Eighty-one percent (124) of the sites visited during the QC process were randomly selected. Nineteen percent (30) of the sites were targeted, focusing on sites where additional data was submitted (Appendix A), sites where work was completed by our consultants, and sites that were

* Lawson, J., R. Darling, D. Penrose, and J.D. Gregory. 2002. Stream Identification and Mapping for Water-Supply Watershed Protection. In Proceedings, Watershed 2002, February 23-27, 2002, Fort Lauderdale, FL.

originally determined as "borderline" by staff. Of the 124 randomly selected sites 94 of the sites remained unchanged and only 30 sites (25 extended plus 5 retracted) exhibited a change (Table 3).

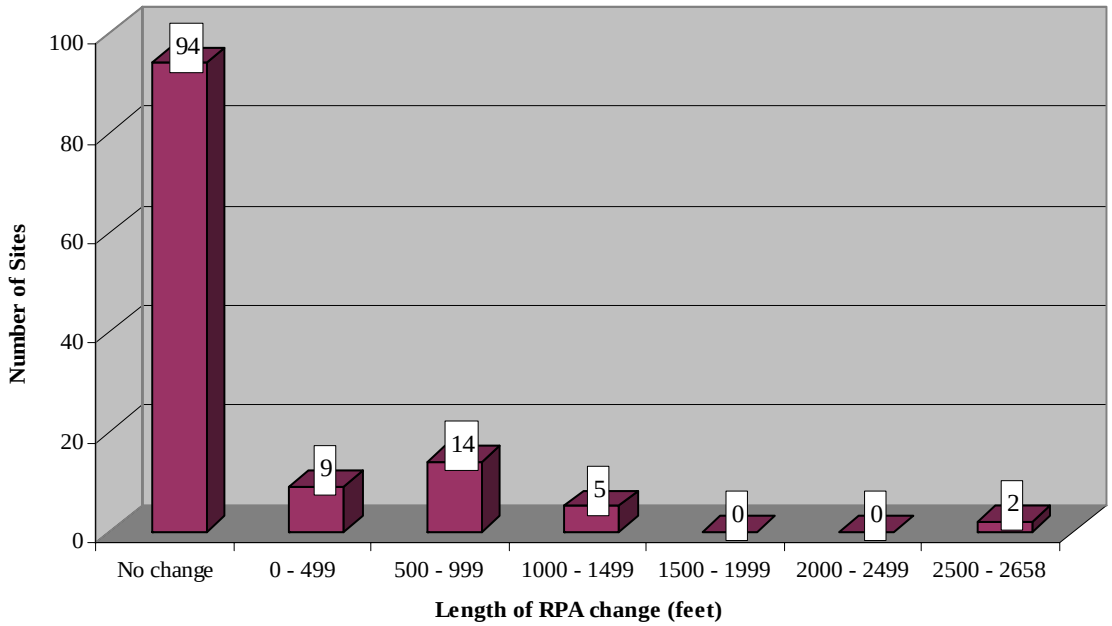
Table 3: Number of random and targeted QC sites exhibiting a change in perennial stream extent.

	Unchanged	Extended	Deleted	Total Sites
Random Sites	94	25	5	124
Targeted Sites	15	14	1	30
All QC Sites	105	41	8	154

Randomly Selected Sites Results and Examples

The degree of change was evaluated based on the length of stream reclassified as perennial or non-perennial. The upstream limit of a perennial stream is defined by physical features such as head cuts, grade controls, channel confluence, and springs or changes in sinuosity, channel slope, or floodplain. Evaluating sites under different hydrological conditions provided an opportunity to refine the upstream limits based on observations under various flow conditions. Sites that were originally visited in the drought were resurveyed under more normal or wetter conditions. Likewise, sites visit conducted during wetter conditions were resurveyed under more normal or drier conditions. Seventy-six percent (94 sites) of the randomly selected sites had no change in stream classification or location defining the upstream extent of the perennial stream. An additional 13 sites had a change of less than 1000 feet in the upstream extent. Only 2 sites (l.6 percent) had a change of more than 1,500 feet (Figure 1).

Figure 1: Number of random sites exhibiting a change in the upstream extent of the perennial stream.



Site PH067402A (Figure 2) in the Popes Head Creek watershed is an example of an extreme case, where the upper extent of perenniality changed significantly by approximately 2638 feet. This randomly selected site was initially surveyed in August 2002 while the Northern Virginia region suffered from a hydrologic drought. The drought was severe enough to cause the groundwater table to drop, disconnecting the source of groundwater recharge to the stream.

During June 2002, under severe hydrologic drought, the upper reaches of this stream were found to be dry. The origins of flow began at a pool downstream of the Fairfax County Parkway. A survey was completed downstream of the Fairfax County Parkway and was designated perennial (Figure 3).

This stream was randomly selected for resurveyed as part of the QC study. The resurvey took place under normal weather conditions, in May 2004. Strong perennial characteristics, including strong flow, hydric soils, a strong presence of groundwater seeps and springs, a moderate amount of iron-oxidizing bacteria, and a prolific community of Net-spinning Caddisflies, Stoneflies, and tadpoles provided a confident indication that the stream was perennial well above the initial extent (Figure 4).

The RPA was extended for this stream based on the conclusive data collected during the QC study, under normal weather conditions.

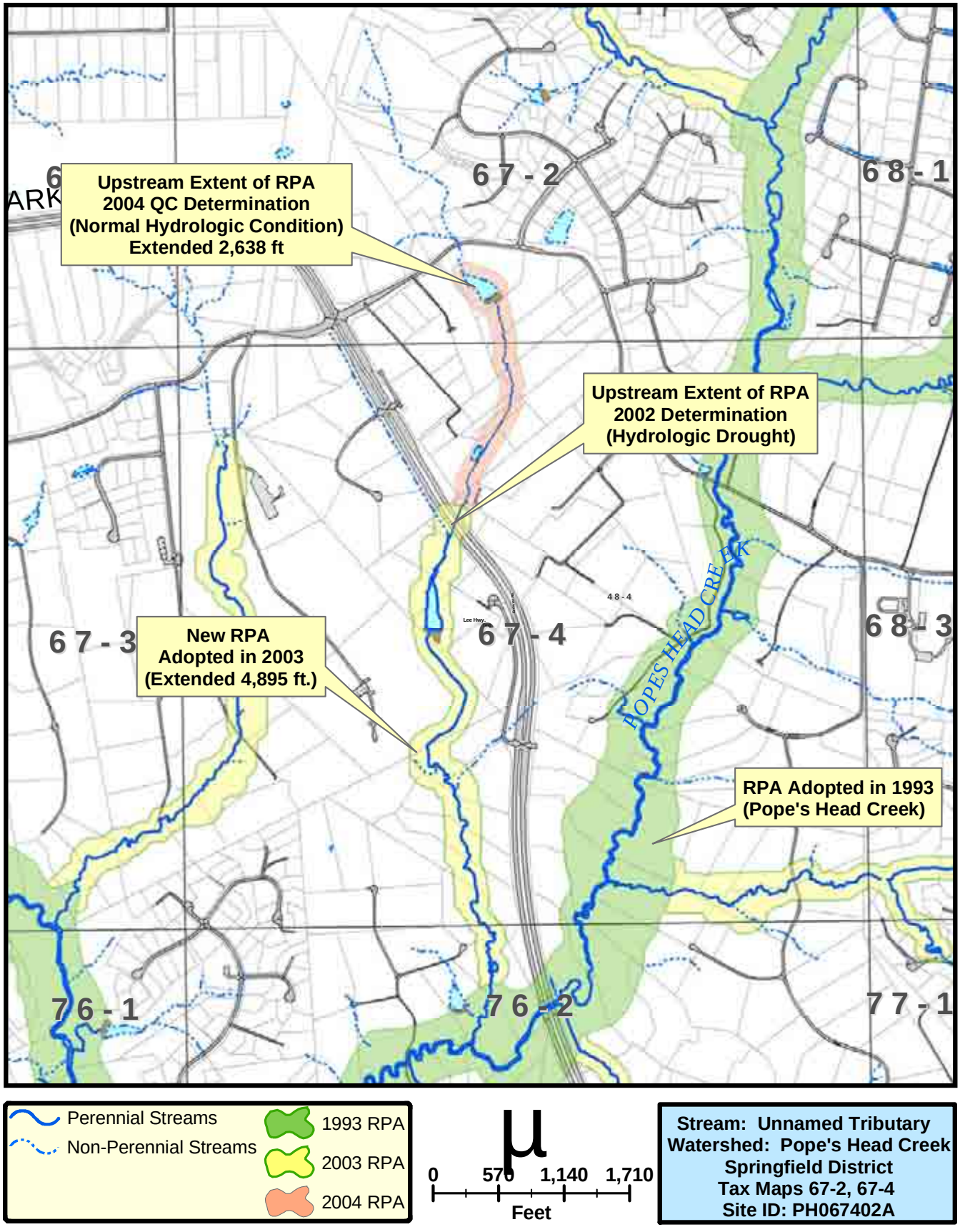


Figure 2: Location of Popes Head Creek site - PH067402A

Figure 3: Photograph of site PH067402A on 6/18/02. Picture taken downstream of Fairfax County Parkway.

Figure 4: Photograph of site PH067402A on 5/12/04, taken approximately 2,638 feet upstream of location survey on 6/18/02 (Figure 3).

Site PC088204A (Figure 5) in the Pohick Creek watershed is an example of a less extreme case, where the upper extent of perenniality changed by approximately 814 feet. This randomly selected site was initially surveyed by staff in June 2003 while the region was in an extremely moist weather condition and designated the stream as non-perennial, based on a score of 20 points.

PC088204A displayed strong flow and groundwater seeps and springs were prevalent throughout the reach. However, the final determination was based mostly on the lack of strong geomorphological and biological indicators (Figure 6).

As part of the QC study, this site was resurveyed under near normal weather conditions. In August 2004, the stream received an overall score of 24 points and was designated perennial. Since the stream was seen in both extremely moist and near normal non-drought conditions, the team was able to give the stream a more confident perennial designation (Figure 7).

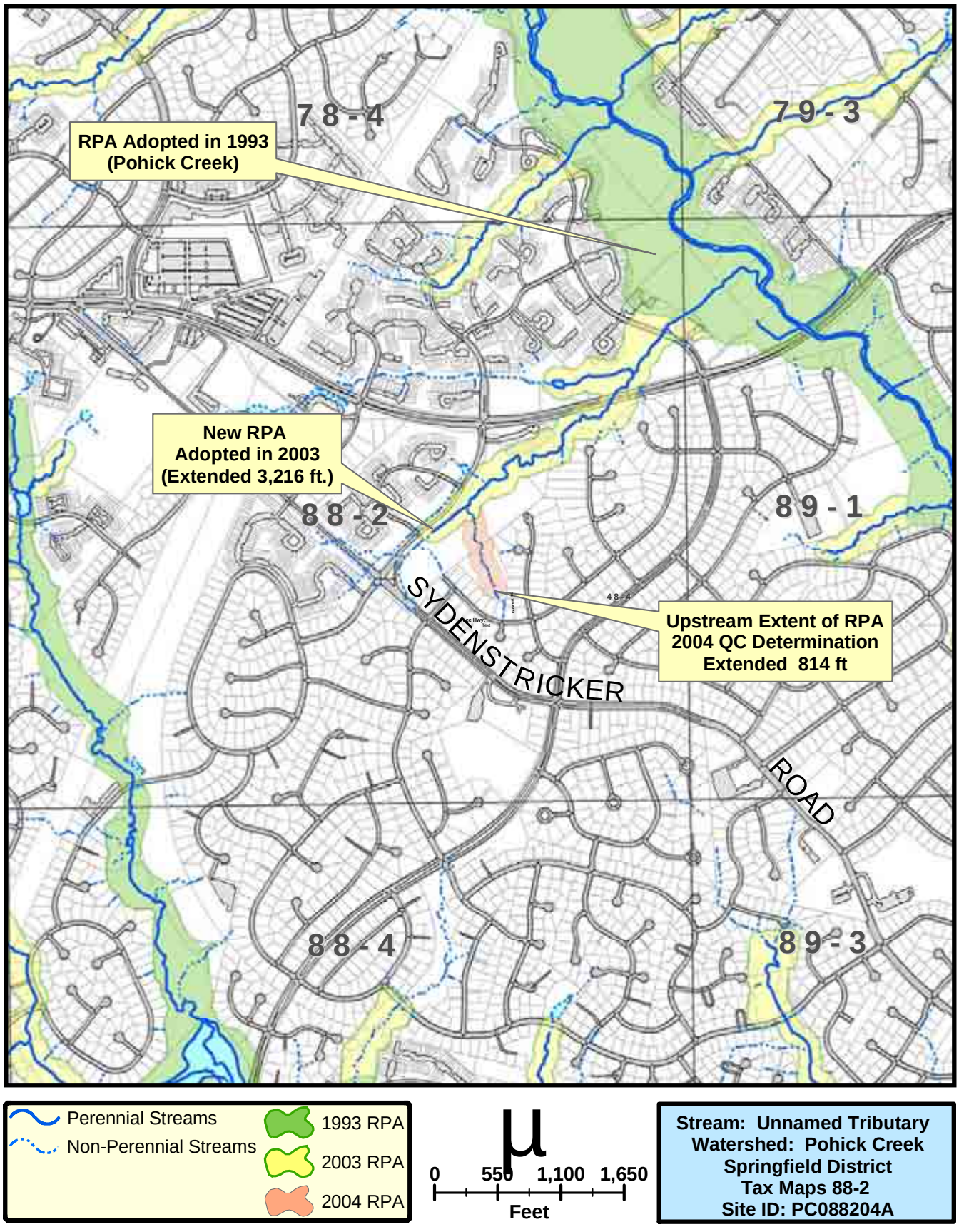


Figure 5: Location of Pohick Creek site - PC088204A

Figure 6: Photograph of site PC088204A on 6/11/03. Stream designated non-perennial.

Figure 7: Photograph of site PC088204A on 8/25/04. Stream designated perennial.

Scoring

Out of the 154 total sites visited in the QC study, there were 116 sites (75%) in which the original reach coincided with the QC surveyed reach. That is, the same stream reach was score for both the original and QC surveys. For these sites the QC score can be directly compared to the original score. The remaining thirty-six QC sites had stream reaches that extended slightly upstream or downstream of the original site or consisted of two to three sites combined.

For the stream reaches that were the same, a difference in score greater than ± 7 points was used as a flag to further evaluate and discuss the difference between the original and QC survey before making a final stream classification. In addition to the difference in score, the final stream classifications were compared between the two surveys.

Of the 116 QC sites where the scored reaches were identical to the originals, 99 had a score that was within ±7 points of the original score and 17 had a difference of more than 7 points from the original (Figure 8).

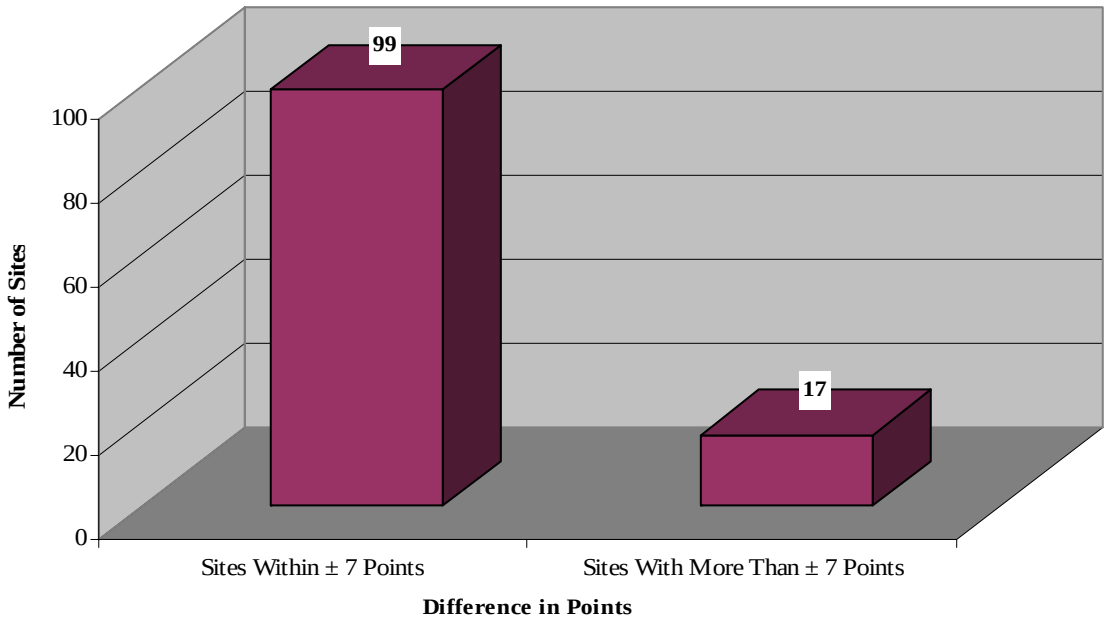


Figure 8: QC sites that were identical to original sites, showing the difference in number of points between original and QC data.

Overall, 95 out of the 116 sites experienced neither a change in final determination of perenniality, nor a change in the RPA length (Table 4).

Table 4: QC sites that were identical to original sites.

Difference in Points Between Original and QA/QC	No Change in RPA	Extended RPA	Retracted RPA	Total Sites
Sites Within ±7 Points	84	13	2	99
Sites With More Than ±7 Points	11	4	2	17
Total Sites	95	17	4	116

There were seventeen sites that had a difference in score of over seven points from the original data. Of these, eleven did not have a change in RPA and six did have a change. For those that where reclassified, the data was reevaluated or site revisited before making a final stream reclassification.

RPA Review and Additional Data Submitted

Throughout 2004, additional data was submitted by citizens and environmental consultant firms for eight stream locations where new developments are planned in the County. At four sites, the additional data resulted in a change in final determination and length of RPA. The Wedderburn site was the only official RPA plan submitted and approved to reclassifiy a stream from perennial to non-perennial. The other four sites had no change in the stream classification or corresponding RPA. Appendix A has detailed explanations of each site and the data used to make the final stream classification.

Site	Tax Map	Outcome
Burkes Spring Branch	40-2	No change
Cedarest Street	48-4	No change
Cinder Bed Road	99-2	No change
Crimmins Lane	41-1	RPA extended upstream
Harrison Lane	92-2, 92-4	No change
Hidden Creek Drive	19-2	RPA extended upstream
Lewinsville Park	30-3	RPA moved downstream
Wedderburn Property	39-3	Approved RPA plan. RPA moved downstream.

RECOMMENDATIONS

The field resurveys resulted in approximately 10 miles of stream being reclassified with 7.7 miles being added and 2.2 miles being retracted. This net change of 5.5 miles of perennial streams shown on the map represents 0.6 percent of the total 850 miles of perennial stream within Resource Protection Areas (RPAs) on the adopted 2003 Chesapeake Bay Preservation Area (CBPA) maps. The results of the field surveys for the randomly selected sites indicate the level of quality and dependability of the CBPA maps. Seventy-six percent (94 sites) of these sites had no change in the stream classification or upstream extent of perenniality (Table 5). Of the 30 randomly selected sites that had changes, 23 sites had less than a 1000 foot change in the upstream limits of perenniality. Only 2 sites changed more than 1,500 feet. In general, these changes were refinements to the upstream limits of perenniality and were not complete reclassifications of an entire stream.

Table 5: Number of random sites exhibiting a change in RPA.

	Unchanged	Extended	Retracted	Total Sites	Net Change
Random Sites Only	94 (76%)	25 (20%)	5 (4%)	124	20 (16%)

Overall, the perennial stream identification and mapping project has greatly increase the mapping accuracy of perennial streams as compared to the original U.S. Geological Survey maps used to define tributary streams for the 1993 Chesapeake Bay Preservation Ordinance. The stream mapping effort meets the state regulation requirements of conducting a site-specific evaluation of water bodies of perennial flow using a scientifically valid system of in-field indicators. The mapping effort has relieved property owners of the burden of having studies performed for every development site in proximity to a stream located outside of the RPAs depicted on the 1993 map.

Based on the results of this study, staff does not recommend that additional QA/QC studies be conducted on regular or periodic bases. As discussed above, the primary reasons for this recommendation include:

- There are no specific criteria such as hydrologic conditions (drought or wet) during the original surveys to use to target additional sites for resurvey.
- The QA/QC resurveys took a significant level of effort and resulted in 0.6 percent change in the total miles of perennial stream on the CBPA maps. Continuing to randomly selected site for resurvey would likely result in even less change because areas of concern have been targeted and resurveyed as part of this QA/QC study.
- The stream mapping project meets the requirements of state regulations to perform a site-specific evaluation of water bodies of perennial flow using a scientifically valid system of in-field indicators.
- The primary goal of the project was to improve the mapping of perennial stream compared to those shown on the U.S. Geological Survey's topographic maps. This goal has been achieved.

The Public Facilities Manual (PFM) allows property owners to contest perennial stream determinations made by DPWES staff. In addition, the Board of Supervisors can always direct staff to perform additional stream surveys on case by case bases if desired.

NEXT STEPS

The Chesapeake Bay Preservation Area maps will be updated based on the results of the field QC data. In addition, the 2003 maps and original field data will be reviewed and maps revised as needed to assure the original data was capture properly and the corresponding Resource Protection Areas delineated correctly. This review includes making sure the width of the original 1993 RPAs is consistent with the revised definition of RPAs in the 2003 CBPO and the location of the 1997 stream GIS data layer. The proposed amendments to the map will be presented to the Board of Supervisors in spring 2005.